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(54) **ELECTRICALLY CONDUCTING TERMINAL**

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H01R 13/11	(2006.01)
H01R 13/42	(2006.01)

(52) **U.S. Cl.**

CPC ***H01R 13/187*** (2013.01); ***H01R 13/111*** (2013.01); ***H01R 13/42*** (2013.01)

(58) **Field of Classification Search**

CPC H01R 13/111; H01R 13/42; H01R 13/187
USPC 439/851, 748, 842, 843
See application file for complete search history.

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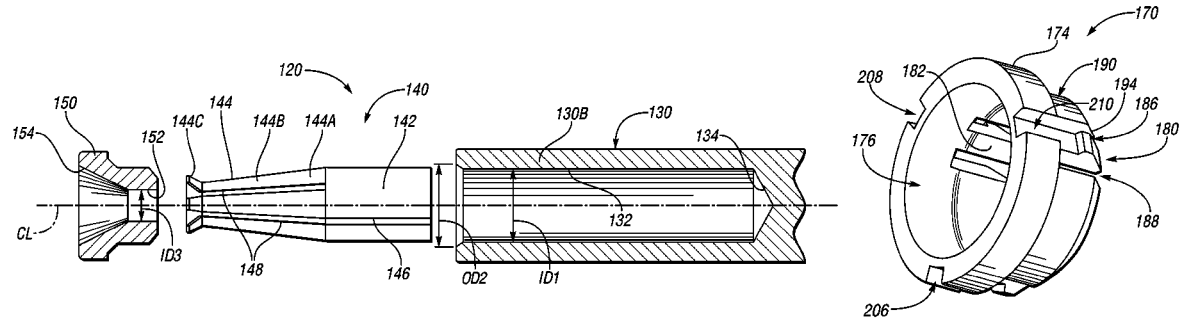
(57) **ABSTRACT**

An electrically conducting terminal having capabilities to facilitate electrically connecting to one or more connectors is disclosed. The electrically conducting terminal may include a recessed end to receive a connector. The recessed end may include a resilient element, such as but not limited to a female contact, to facilitate electrical conductivity between the connector and the terminal. The electrically conducting terminal may include an end cap, end piece, or other feature to facilitate retaining the resilient element within the recessed end.

18 Claims, 6 Drawing Sheets



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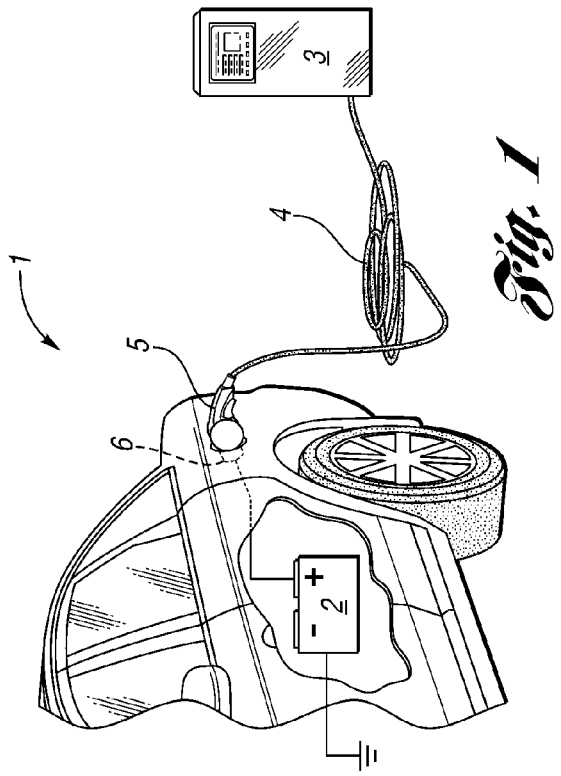


Fig. 1

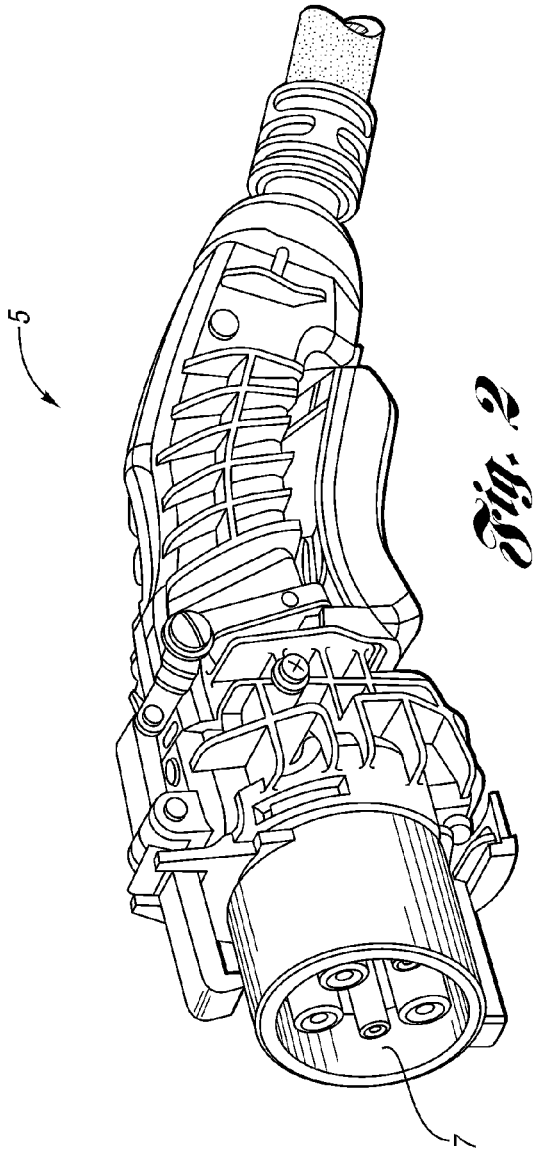
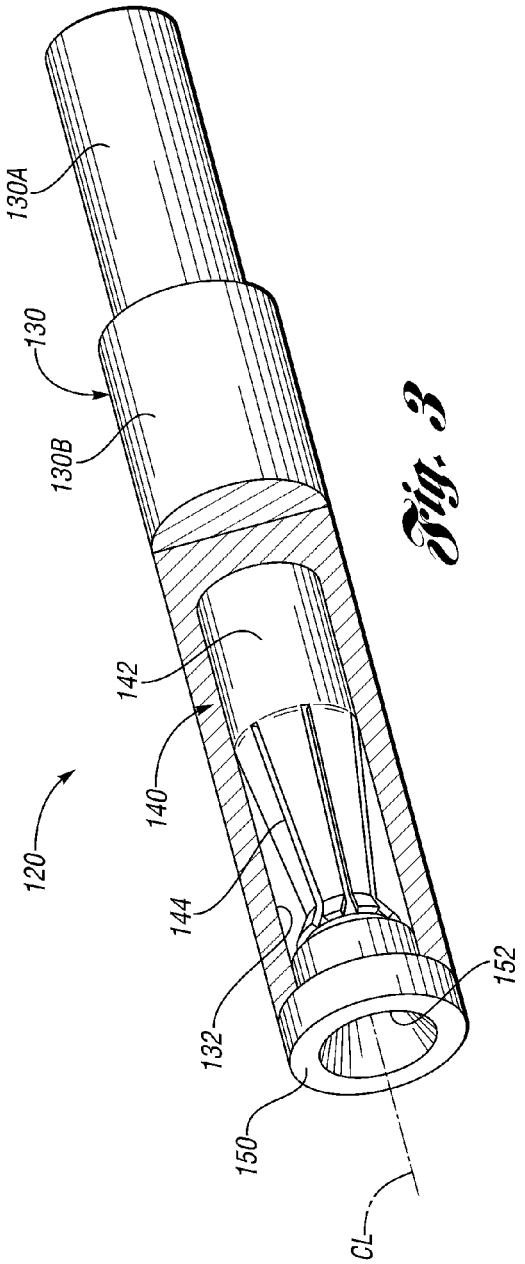


Fig. 2


130A
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120
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132
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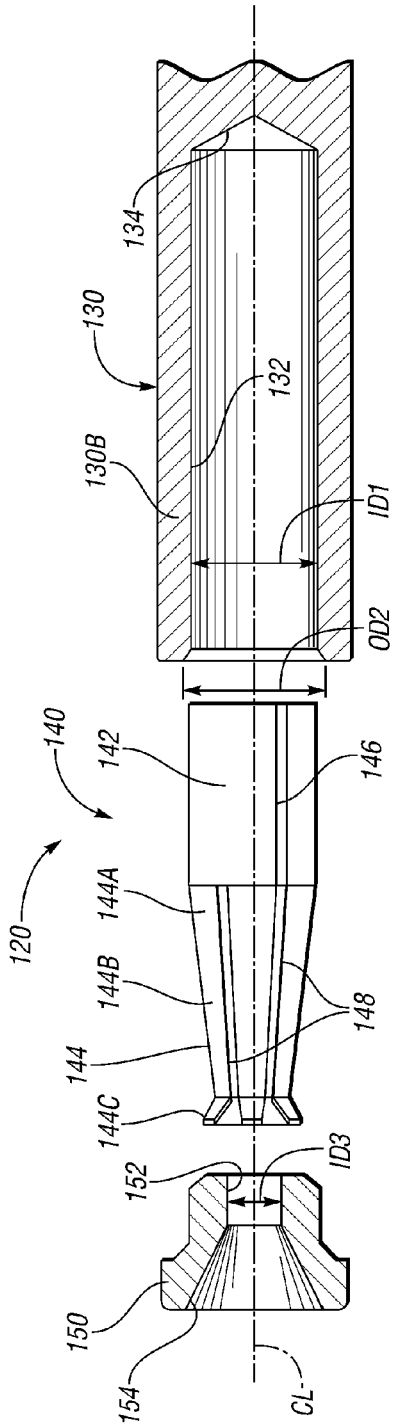
CL

Fig. 3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CL

Fig. 4

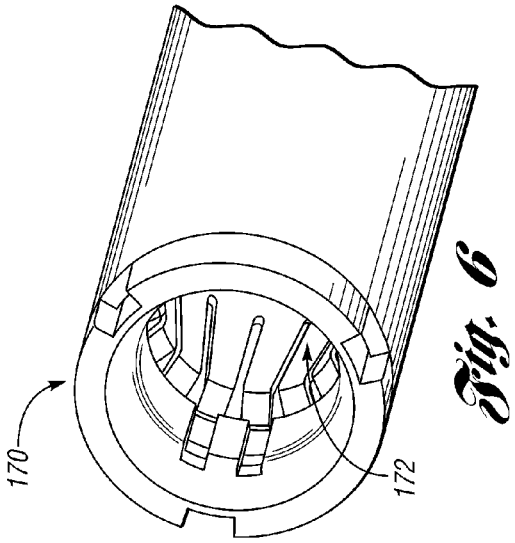

Fig. 6

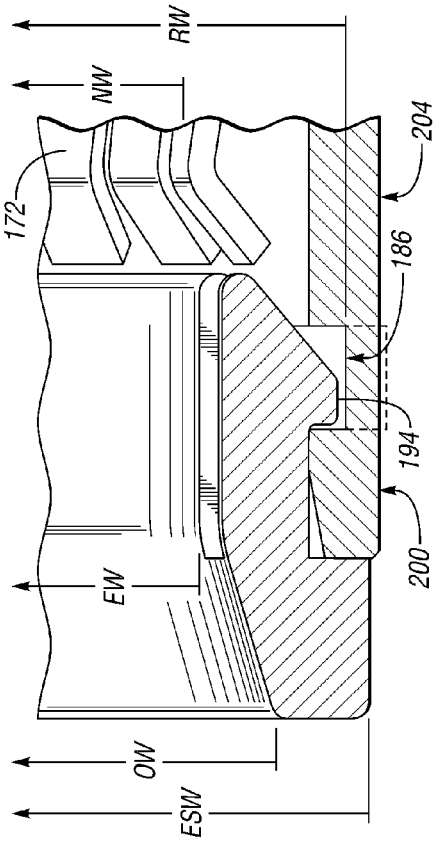

Fig. 7

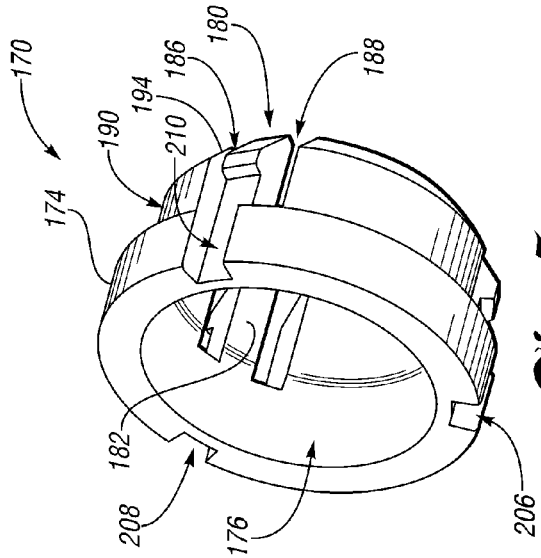

Fig. 5

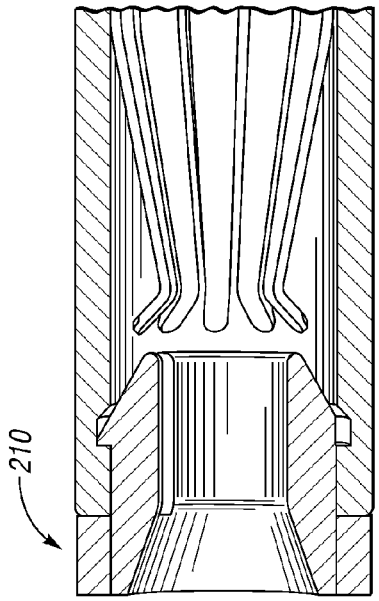

Fig. 10

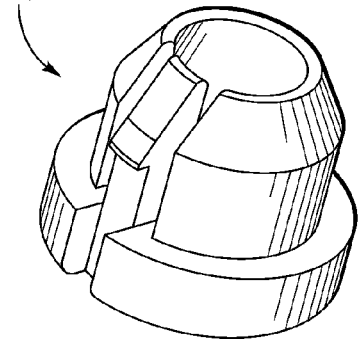

Fig. 8

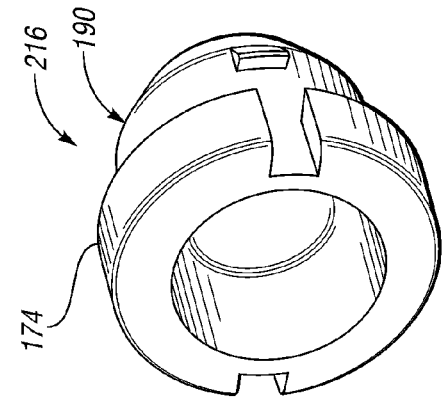

Fig. 12

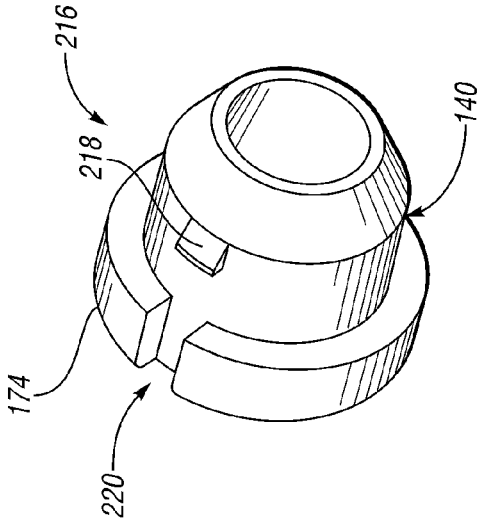

Fig. 11

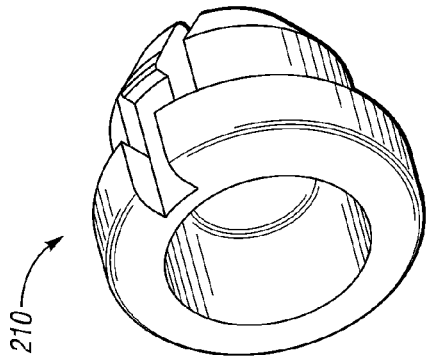

Fig. 9

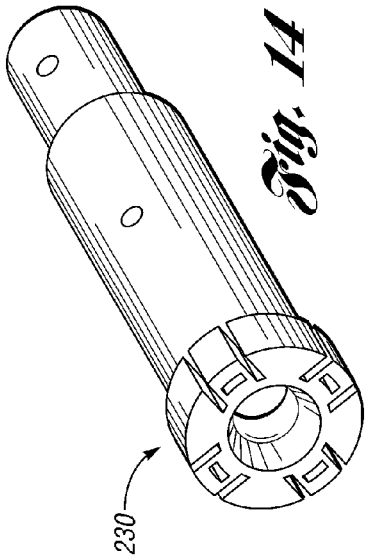

Fig. 14

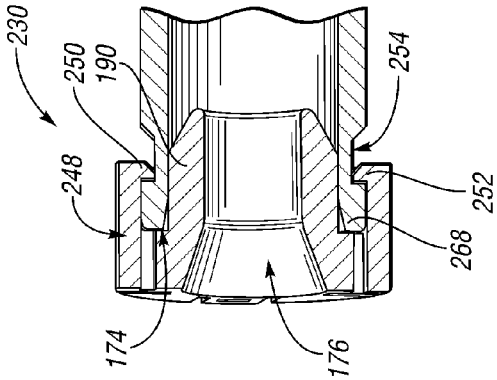

Fig. 16

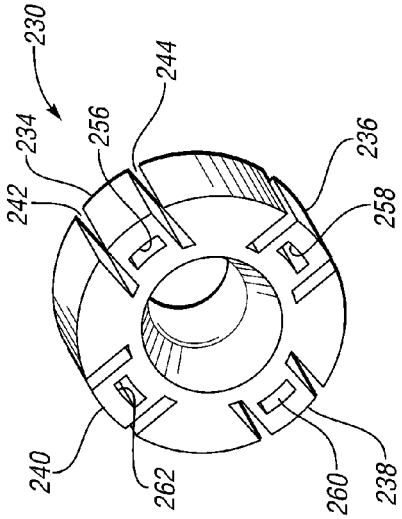

Fig. 13

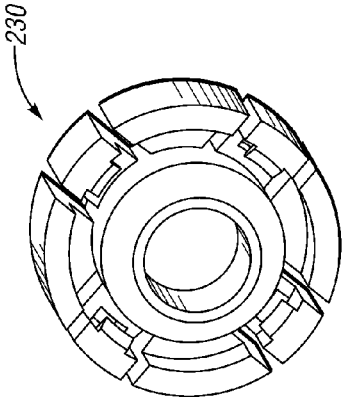

Fig. 15

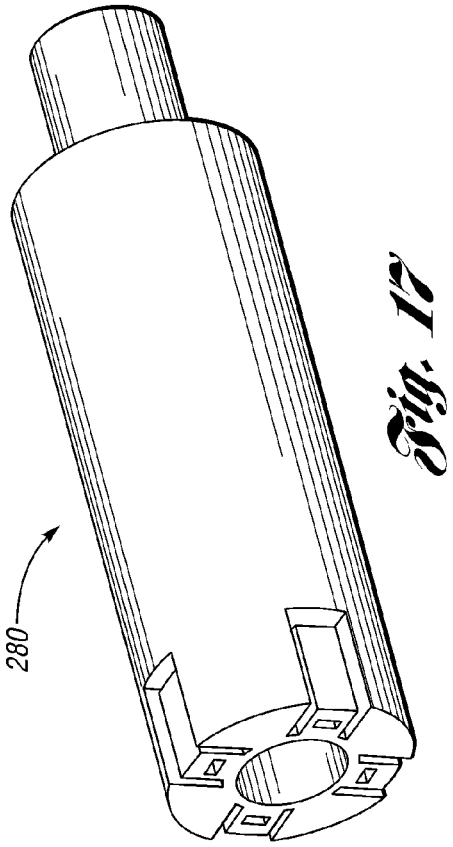

Fig. 17

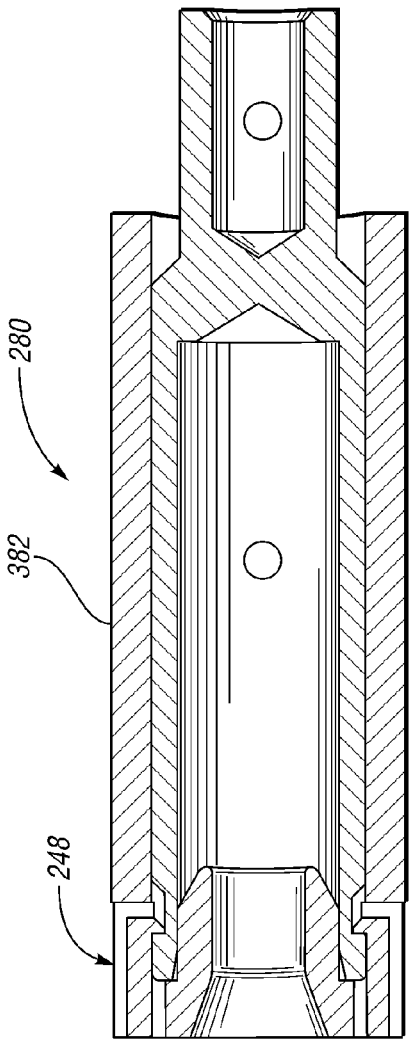

Fig. 18

ELECTRICALLY CONDUCTING TERMINAL

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. application Ser. No. 13/214,376 filed Aug. 22, 2011, now U.S. Pat. No. 8,840,436, which is a continuation-in-part of U.S. application Ser. No. 13/101,592 filed May 5, 2011, now U.S. Pat. No. 8,876,562, the disclosures of which are hereby incorporated in their entirety by reference herein.

TECHNICAL FIELD

The present invention relates to electrical terminals, such as but not limited to terminals of the type having a resilient element operable to facilitate electrical connectivity between the terminal and an electrical connector.

BACKGROUND

Electrical terminals are used in a number of applications to facilitate electrical connecting one element to another. Some electrical terminals may be configured to facilitate use with a removable connector of the tape that may be repeatedly inserted and removed or otherwise configured to repeatedly engage and disengage the electrical terminal. The ability of the electrical terminal to facilitate electrical connectivity with such a removable connector can be problematic if an electrical connection area between the terminal and connector has poor connectivity, particularly when tolerance variations or degradation from repeated use causes a mating arrangement between the components to become loose or otherwise insecure.

SUMMARY

One non-limiting aspect of the present invention contemplates an electrical terminal configured to electrically connect to a connector, the terminal comprising: an electrically conducting body having a recessed end, the recessed end having a first portion with a first width; a resilient conducting element positioned within the first recessed end, the conducting element having a first opening with a second width to provide an interference fit with the connector; and an end cap positioned within the first recessed end outboard of the resilient conducting element to secure the resilient conducting element within the recessed end.

One non-limiting aspect of the present invention contemplates the first width is greater than the second width and the second width is less than a width of the connector.

One non-limiting aspect of the present invention contemplates the end cap is comprised of a conducting material and welded to the recessed end.

One non-limiting aspect of the present invention contemplates the end cap is comprised of a non-conducting material.

One non-limiting aspect of the present invention contemplates the end cap includes a resilient snap finger, the resilient snap finger interlocking with a channel of the connector to secure the end cap within the recessed end.

One non-limiting aspect of the present invention contemplates the end cap is comprised of a non-conducting material.

One non-limiting aspect of the present invention contemplates the channel is at an exterior portion of the connector.

One non-limiting aspect of the present invention contemplates the channel is at an interior portion of the connector.

One non-limiting aspect of the present invention contemplates the end cap has a second opening with a third width to provide an interference fit with the connector, the connector passing through the second opening to be received within the first opening.

One non-limiting aspect of the present invention contemplates the third width is approximately equal to a width of the connector and wherein the third width is greater than the second width.

One non-limiting aspect of the present invention contemplates the first width is greater than the third width.

One non-limiting aspect of the present invention contemplates the resilient element is a female type contact having a body portion and a plurality of flexible beams that extend from the body portion, wherein the flexible beams include a base portion having a width approximately equal to the first width when inserted in the recessed end and a tip portion having a width that is smaller than the width of the base portion.

One non-limiting aspect of the present invention contemplates an electrically conducting terminal comprising: an electrically conducting body having a recessed end; a resilient conducting element positioned within the first recessed end; and an end cap positioned within the first recessed end outboard of the resilient conducting element to prevent removal of the resilient conducting element.

One non-limiting aspect of the present invention contemplates the end cap is comprised solely of a conducting material.

One non-limiting aspect of the present invention contemplates the end cap is comprised solely of a non-conducting material.

One non-limiting aspect of the present invention contemplates the end cap includes a snap finger that flexes inwardly during insertion of the end cap into the recessed end, and thereafter, flexes outwardly to retain a finger within a channel of the recessed end.

One non-limiting aspect of the present invention contemplates the end cap includes a first portion having a width greater than an interior width of a beginning portion of the recessed end; a second portion having a width approximately equal to the interior width of the beginning portion of the recessed end; an opening through the first portion and the second portion; and wherein a width of the snap finger proximate the second portion is greater than the width of the second portion and less than the width of the first portion.

One non-limiting aspect of the present invention contemplates the first portion includes a recess rearward of the snap finger, the channel having a width approximately equal to the width of the second portion.

One non-limiting aspect of the present invention contemplates an electrical conducting terminal comprising: an electrically conducting body having a recessed end; a resilient conducting element positioned within the first recessed end; and an snap-fit end cap positioned within the first recessed end outboard of the resilient conducting element to prevent removal of the resilient conducting element, the snap-fit end cap including a snap finger that flexes in a first direction during insertion of the snap-fit end cap into the recessed end, and thereafter, flexes in a second direction to be retained within a channel of electrically conducting body, thereby securing the snap-fit end cap outboard of the resilient conducting element to prevent the resilient conducting element from being removed without removal of the snap-fit end.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is pointed out with particularity in the appended claims. However, other features of the present

invention will become more apparent and the present invention will be best understood by referring to the following detailed description in conjunction with the accompany drawings in which:

FIG. **1** illustrates a charging system as contemplated by one non-limiting aspect of the present invention.

FIG. **2** illustrates a charging connector as contemplated by one non-limiting aspect of the present invention.

FIGS. **3-4** illustrate a terminal having a resilient element configured as a female contact in accordance with one non-limiting aspect of the present invention.

FIGS. **5-7** illustrate a snap-fit end cap as contemplated by one non-limiting aspect of the present invention.

FIGS. **8-10** illustrate a snap-fit end cap as contemplated by one non-limiting aspect of the present invention.

FIGS. **11-12** illustrate a snap-fit end cap as contemplated by one non-limiting aspect of the present invention.

FIGS. **13-16** illustrate a snap-fit end cap as contemplated by one non-limiting aspect of the present invention.

FIGS. **17-18** illustrate a snap-fit end cap as contemplated by one non-limiting aspect of the present invention.

DETAILED DESCRIPTION

As required, detailed embodiments of the present invention are disclosed herein; however, it is to be understood that the disclosed embodiments are merely exemplary of the invention that may be embodied in various and alternative forms. The figures are not necessarily to scale; some features may be exaggerated or minimized to show details of particular components. Therefore, specific structural and functional details disclosed herein are not to be interpreted as limiting, but merely as a representative basis for teaching one skilled in the art to variously employ the present invention.

FIG. **1** illustrates a charging system **1** operable to facilitate charging a vehicle charging system **2** with energy provided from a wall outlet or charging station **3** as contemplated by one non-limiting aspect of the present invention. The system **1** may include a cordset **4** having plurality of conducting wires and/or other conducting elements to facilitate delivering current between the charging station **3** and the vehicle charging system **2**. One end of the cordset **4** may include a connector assembly **5** configured to be received within a charging receptacle **6** associated with the vehicle charging system. The connector assembly **5** may be of the type described in U.S. Pat. No. 7,878,866, the disclosure of which is hereby incorporated by reference in its entirety by reference.

The charging receptacle **6** may be configured to facilitate establishment of an electrical connection between a plurality of electrically conducting elements of the vehicle charging system **2** and the charging station **3**. The charging receptacle **6** may facilitate the desired electrical connection by providing interconnecting conducting elements and/or by guiding the vehicle charging system and cordset conducting elements into a mating arrangement with each other. The charging receptacle **6** may be configured to support a multiple pin or port connection methodology for facilitating electrically interconnecting the vehicle charging system and cordset conducting elements, including but not limited to that specified in Society of Automotive Engineer (SAE) J1772 and International Electrotechnical Commission (IEC) 51851.

FIG. **2** illustrates the charging connector **7** as contemplated by one non-limiting aspect of the present invention. The illustrated charging connector **7** may be configured to facilitate electrically interconnecting vehicle charging system conducting elements with cordset conducting elements by guiding the elements into engagement with each other. The charging connector **22** may include an electrically conducting terminal **30**. The terminal **7** may be configured to facilitate interconnecting pins of the receptacle **6** with wires included within the cordset **4**.

FIGS. **3-4** illustrate the terminal **120** as contemplated by one non-limiting aspect of the present invention. As shown therein, the illustrated female type electrical connector **120** includes a housing, indicated generally at **130**, that is generally hollow and cylindrical in shape. However, the housing **130** may have any desired shape. The housing **130** can be formed from any desired material, but preferably is formed from a material that is relatively rigid and electrically conductive. If desired, an outer layer of an electrically non-conductive material (not shown) may be provided about the housing **130**. The illustrated housing **130** includes a first portion **130**A and a second portion **130**B, the purposes of which will be explained below. The first portion **130**A and the second portion **130**B can be integrally formed from a single piece of material as shown, but may alternatively be formed from two or more separate pieces material that are secured together. The illustrated first and second portions **130**A and **130**B of the housing **130** are co-axially aligned along a centerline CL, but may be non-aligned if desired.

The first portion **130**A of the housing **130** is adapted to electrically connect the female type electrical connector **120** to the source of electrical energy. For example, the first portion **130**A may define an aperture (not shown) that extends into an end portion thereof. The aperture can be adapted to receive a lead wire (not shown) that is connected the source of electrical energy. The lead wire may be secured within the aperture by a soldering, crimping, or other process. Alternatively, the first portion **130**A of the female type electrical connector **120** can be connected to the source of electrical energy using a mechanical electrical connector or any other fastener arrangement if so desired. The first portion **130**A may define any other structural features for a desired purpose.

The second portion **130**B of the housing is configured to receive and frictionally engage the male type electrical connector. To accomplish this, the second portion **130**B can be formed having a bore **132** that extends any length into an end portion thereof. Thus, the illustrated second portion **130**B defines an open end where the bore **132** is provided and a closed end defined by a back wall **134**. Further, it should be appreciated that the cylindrical wall of the second portion **130**B may be any thickness for a desired application. The second portion **130**B will be further described below.

The illustrated female type electrical connector **120** also includes a female type contact or electrical terminal, indicated generally at **140**, that is disposed within the bore **132**. The female type contact **140** is a hollow, cylindrical structure that includes a body portion **142** and having a plurality of flexible beams **144** extending therefrom. As shown, an outer cylindrical surface of the body portion **142** is adapted to frictionally engage an inner cylindrical wall of the bore **132** of the second portion **130**B. Engagement between the body portion **142** and the second portion **130**B secures the female type contact **140** within the bore **132** and establishes electrical continuity between the female type contact **140** and the housing **130**. Insertion of the female type contact **140** within the second portion **130**B will be further explained below. Alternative ways of securing the female type contact **140** within the second portion **130**B will also be described and illustrated below.

The illustrated female type electrical connector **120** also includes an optional end piece **150**. The end piece **150** can be secured to the open end of the second portion **130**B. The

illustrated end piece **150** has a through hole **152** formed therethrough. The end piece **150** can be formed from any desired material, but preferably is formed from an electrically non-conductive material such as plastic or the like. The purpose of the end piece **150** will be described in further detail below.

FIG. **4** shows the components of the female type electrical connector **120** prior to assembly. As described above, the bore **132** is formed in the second portion **130**B of the housing **130** so as to define an open end. If desired, a chamfer can be provided around the outer edge of the open end, although such is not required. The back wall **134** can be a generally flat surface or may define a conical shape that is formed by a cutting tool (not shown) used to machine the bore **132**. The bore **132** has an inner diameter ID**1** that is configured to receive the female type contact **140** in the manner explained below. It should be appreciated that the bore **132** can be any size and/or shape for a desired application. The illustrated female type contact **140** can be produced from a sheet of resiliently flexible material that is cut and subsequently shaped to form the cylindrical body portion **142** and the flexible beams **144**, as will be further explained below. In doing so, opposite edges of the sheet are brought together in an opposing fashion to form a gap **146**. The gap **146** axially extends along an entire length of the body portion **142**, although such is not required. The circumferential width of the gap **146** can be selectively adjusted by flexing a cross section of the body portion **142** from a relaxed or biased position to a flexed position. As such, the body portion **142** can be adjustable to provide a desired outer diameter OD**2** of the body portion **142**. The relaxed outer diameter OD**2** of the body portion **142** is slightly larger than the inner diameter ID**1** of the bore **132** prior to the female type contact **140** being inserted into the bore **132**. The gap **146** enables the outer diameter OD**2** of the body portion **142** to be temporarily reduced to facilitate the insertion of the female type contact **140** into the bore **132**.

FIGS. **5-7** illustrates an interior connecting snap-fit end cap **170** operable to be added to one of the terminals **12**, **120** noted above or other similarly recessed terminals in accordance with one non-limiting aspect of the present invention. The end cap **170** may be configured to be positioned outboard of a resilient element **172** (shown as the female contact **140**). Optionally, the end cap **170** may be configured to have a length sufficient to pre-load the resilient element such that it is at least partially compressed to the resilient element **172** toward a rearward wall of the recessed end **132**, which may be beneficial to protecting the contact beams and compensating for manufacturing tolerances. The end cap **170** may be configured to prevent removal of the resilient element **172** from a recessed end. The end cap **170** may include an end stop **174** having a width ESW slightly larger than an outer width ID**1** of the recessed end **132** in order to control how far the end cap **170** is able to insert. The end cap **170** includes an opening **176** to permit passage of a connector (not shown). The opening **176** may include a slightly larger width OW at a beginning portion and then taper down thereafter to a width EW approximately equal to the width of the connector. The width EW may be selected to provide an interference fit with the connector, although it is not necessary that an interference fit be provided as the end cap **170** may be used simply to guide the connector into the resilient element/recessed end **132**. Optionally, a narrowest width NW of the resilient element **146** at the tip portion **144**C may be selected to be slightly smaller than the width EW of the opening **176** and/or the connector in order to insure a sufficient electrical connection between the resilient element **140** and the connector. The exterior width ESW of the end stop **174** may be size to correspond with an exterior width of the terminal **130** in order to provide a flush exterior surface.

The snap-fit end cap **170** may be comprised of a conducting or non-conducting material, such as but not limited to plastic or rubber. The material may be selected to be of a type sufficient to facilitate use of a plurality of snap fingers **180**, **182**, **184**. The snap fingers **180**, **182**, **184** may be defined by channels **186**, **188** (only shown for finger **180**) included within an inserted portion **190** of the end cap **170**. The end of the snap fingers **180**, **182**, **184** may be shaped into a finger **194**. The finger **194** may snap into a corresponding recessed channel **196** of the recessed end **132**. The recessed channel **194** may include a width RW slightly larger than the width ID**1** of the recessed end **132** at an outer portion **200** and a width ID**1** of the recessed end at an inner portion **204**. While the width ID**1** of the recessed end **132** at the outer portion **200** is shown to be equal to the width ID**1** of the inner portion **204**, it may be larger or smaller depending on design consideration of the end cap **170**, e.g., the width of the outer portion **200** may be larger than the inner portion **204** in the event the material characteristics of the end cap **170** require more material to facilitate the contemplated flexing of the snap finger **186**, which may be required in the event the recessed end is relatively narrow.

A recess **206**, **208**, **210** may be included rearward of a tip of each finger to facilitate molding of the end cap **170**. The recesses **206**, **208**, **210** may be sized to approximate the height of the tip so that the end cap **170** can be laterally removed from a molding tool without having to open the tool. This may be beneficial in limiting tooling cost and associated manufacturing cost. Of course, the present invention is not necessarily limited to this configuration and fully contemplates molding at least the end stop portion **174** without the recesses **206**, **208**, **210** so that a continuous ring of material can be provided. The snap-fit end cap **170** is shown to include three snap fingers **180**, **182**, **184** equal distantly spaced about the inserted portion **190**. FIGS. **8-10** illustrate an alternative embodiment of a snap-fit end cap **210** where a single snap finger is included. The use of the single snap finger configuration may be beneficial with narrower connectors and/or terminals where it may not be possible to maintain the structural integrity of the end cap while permitting the use of multiple snap fingers.

Optionally, instead of defining the snap fingers with channels through the inserted portion of the end cap, the channels may be removed. FIGS. **11-12** illustrate an alternative embodiment of a snap-fit end cap **216** similarly configured to the end cap **170** except for having channels **186**, **188** removed. In this configuration, a finger tip **218** instead extends outwardly from the inserted portion **190** to facilitate the snap fit. This configuration may require the size and shape of the end cap **216** and/or its material composition to allow some flexing or bending during insertion so that the finger tip **218** can compress within the outer portion **200** of the inner recess **132**, and thereafter, decompress to be retained within the channel **194**. As with the configuration shown in FIGS. **5-7**, an area **220** behind the finger tip **218** is shown to be removed to form recesses within the end stop portion **174** in order to facilitate removal from a mold tool. Of course, like the other embodiments, this material may not necessarily be removed. The embodiment shown in FIGS. **13-14** includes two fingers **218** to demonstrate the present invention contemplating the end cap including one, two, three or some other number of snap fingers.

FIGS. **13-16** illustrates an exterior connecting snap-fit end cap **230** in accordance with one non-limiting aspect of the present invention. The end cap **230** may be similarly config-

ured to the end caps **170**, **210**, **216** shown above with respect to having an end stop portion **174** and an inserted portion **190**. The opening **176** extends through the end stop **174** and inserted portions **190** to facilitate guiding the connector into the resilient element (not shown). The opening **176** may be size to provide a tapered opening that narrows to more closely align with the connector. The end cap **230**, unlike the end caps **170**, **210**, **216** described above, may include a plurality of snap fingers **234**, **236**, **238**, **240** defined by corresponding channels **242**, **244** (only one channel set is labeled) within an overlapping portion **248** extending beyond the end stop portion **174**. The snap fingers **234**, **236**, **238**, **240** are shown to include fingers **250**, **252** that have a tip retained within a channel **254** included on an exterior portion of the terminal **130**. The configuring of the snap fingers **234**, **236**, **238**, **240** to engage an exterior portion of the connector **130** may be beneficial in facilitating removal of the end cap **230** without having to use a tool, i.e., the tool may be required to remove the interior connecting end caps.

Reliefs **256**, **258**, **260**, **262** may be included in the overlapping portion **248** rearwardly of the tips **250**, **252** of the fingers **234**, **236**, **238**, **240**. The reliefs **256**, **258**, **260**, **262** may be provided to facilitate removal of the end cap **230** from a molding tool without having to open the molding tool, similar to the inclusion of the channels rearward of the tips of the fingers shown above. The terminal shown in FIG. **16** includes a chamfered leading edge **268** that cooperates with a correspondingly chamfered leading edge **270** of the interior portion of the end cap. These chamfered edges **268**, **270** may be helpful facilitating insertion of the end cap **230** within the recessed end of the terminal **130**. The end cap **230** is shown to include four equally spaced snap fingers **234**, **236**, **238**, **240**, however, the end cap **230** may include any number of snap fingers **234**, **236**, **238**, **240** without deviating from the scope and the contemplation of the present invention. The end cap **230** may be comprised of a suitable conducting or non-conducting material.

The end cap shown in FIGS. **13-16** includes the overlapping portion **248** extending a slight distance over the connector **130**. FIGS. **17-18** illustrate an end cap **280** where an overlapping portion **382**, similar to the overlapping portion **248** shown in FIGS. **15-18**, extends approximately the entire length of the first recessed end **12** and to an area proximate the second recessed **14** end to form a sleeve/housing. This sleeve-type of end cap **280** may be integrated within a receptacle of the connector assembly **5** where multiple terminals are inserted into the receptacle to create electrical contacts for receiving the vehicle charging system **6**, i.e., one of the connector **7**. Of course, the present invention is not so limited and fully contemplates the sleeve-type of end cap being a standalone feature added to the terminal instead of being included as part of an assembled housing or other receptacle.

As supported above, the present invention contemplates various end cap configurations to facilitate insulating an end of an electrically conducting terminal and/or to facilitate lowering an insertion force for a pin entering the electrically conducting terminal. The insulating contemplated by the present invention may be beneficial in preventing arcing between an inserting connector and a terminal having the insulating end cap. The use of the insulating end cap may also be beneficial in controlling when an electrical connection is established between the terminal and then inserting connector. The dictation of the electrical connection can be important when used with the noted vehicle charging assembly or other assemblies where multiple pins may be received within multiple terminals and their existing need to dictate an order in which the pins are able to establish a corresponding electrical connections, i.e., it may be beneficial have one pin electrically connect prior to one or more of the other pins.

While exemplary embodiments are described above, it is not intended that these embodiments describe all possible forms of the invention. Rather, the words used in the specification are words of description rather than limitation, and it is understood that various changes may be made without departing from the spirit and scope of the invention. Additionally, the features of various implementing embodiments may be combined to form further embodiments of the invention.

What is claimed is:

1. An electrical terminal comprising:

an electrically conductive body having a recessed end, the recessed end having a first portion with a first width;

a resilient conductive element positioned within the recessed end, the conductive element having a first opening with a second width to provide an interference fit with a connector; and

an end cap positioned within the recessed end outboard of the resilient conductive element to secure the resilient conductive element within the recessed end;

wherein the end cap has a second opening sized to receive the connector through the second opening into the first opening;

wherein the end cap pre-loads the resilient conductive element to at least partially compress the resilient conductive element between the end cap and a rearward wall of the recessed end; and

wherein the resilient element is a female type contact having a body portion and a plurality of flexible beams that extend from the body portion, wherein the flexible beams include a base portion having a width approximately equal to the first width when inserted in the recessed end and a tip portion having a width that is smaller than the width of the base portion.

2. The electrical terminal of claim **1** wherein the first width is greater than the second width and the second width is less than a width of the connector.

3. The electrical terminal of claim **1** wherein the end cap is comprised of a conductive material and welded to the recessed end.

4. The electrical terminal of claim **1** wherein the second opening has a third width sized to provide an interference fit with the connector.

5. The electrical terminal of claim **1** wherein the end cap includes a resilient snap finger, the resilient snap finger interlocking with a channel of the electrically conductive body to secure the end cap within the recessed end.

6. The electrical terminal of claim **5** wherein the end cap is comprised of an insulation material.

7. The electrical terminal of claim **5** wherein the channel is at an exterior portion of the electrically conductive body.

8. The electrical terminal of claim **5** wherein the channel is at an interior portion of the electrically conductive body.

9. The electrical terminal of claim **1** wherein the second opening has a third width that is approximately equal to a width of the connector and wherein the third width is greater than the second width.

10. The electrical terminal of claim **9** wherein the first width is greater than the third width.

11. An electrically conductive terminal comprising:

an electrically conductive body having a recessed end having a first portion with a first width;

a resilient conductive element positioned within the recessed end, the conductive element having a first opening with a second width sized to provide an interference fit with a connector; and

an end cap positioned within the recessed end outboard of the resilient conductive element to prevent removal of the resilient conductive element;

wherein the end cap has a second opening sized to receive the connector through the second opening into the first opening;

wherein the second opening has a third width sized smaller than the connector to provide an interference fit with the connector; and

wherein the end cap is comprised solely of an insulation material.

12. The electrical conductive terminal of claim **11** wherein the end cap includes a snap finger that flexes inwardly during insertion of the end cap into the recessed end, and thereafter, flexes outwardly to retain a finger within a channel of the recessed end.

13. The electrical conductive terminal of claim **12** wherein the end cap comprises:

a first portion having a width greater than an interior width of a beginning portion of the recessed end; and

a second portion having a width approximately equal to the interior width of the beginning portion of the recessed end;

wherein the second opening extends through the first portion and the second portion; and

wherein a width of the snap finger proximate the second portion is greater than the width of the second portion and less than the width of the first portion.

14. The electrical conductive terminal of claim **13** wherein the first portion includes a recess rearward of the snap finger, the channel having a width approximately equal to the width of the second portion.

15. An electrical terminal comprising:

an electrically conductive body having a recessed end, the recessed end having a first portion with a first width;

a resilient conductive element positioned within the recessed end, the conductive element having a first opening with a second width to provide an interference fit with a connector; and

an end cap positioned within the recessed end outboard of the resilient conductive element to secure the resilient conductive element within the recessed end;

wherein the end cap has a second opening sized to receive the connector through the second opening into the first opening;

wherein the end cap pre-loads the resilient conductive element to at least partially compress the resilient conductive element between the end cap and a rearward wall of the recessed end; and

wherein the end cap includes a resilient snap finger, the resilient snap finger interlocking with a channel of the electrically conductive body to secure the end cap within the recessed end.

16. The electrical terminal of claim **15** wherein the end cap is comprised of an insulation material.

17. The electrical terminal of claim **15** wherein the channel is at an exterior portion of the electrically conductive body.

18. The electrical terminal of claim **15** wherein the channel is at an interior portion of the electrically conductive body.

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